12. A 400 V, 3-phase, 50 Hz, star-connected induction motor has the following test results :

No-load test	...	400 V	8.5 A	1,100 W
Blocked rotor test	...	180 V	45 A	5,799 W

Calculate the line current and power factor at 4% slip. The stator resistance per phase is 0.5 Ω.

13. Determine the starting torque of an induction motor in terms of its full-load torque when started by means of (i) star-Delta starter ; (ii) by an autotransformer starter with 50% taps. The motor draws 5 times full-load current when switched directly on line and has a full-load slip of 4%.

Or

14. Discuss briefly the various methods of controlling the speed of a 3-phase induction motor. Draw the speed torque characteristics in each case.

15. Explain the principle of operation of an Induction Generator. Draw its phasor diagram and explain the equivalent circuit parameters.

Or

16. With double revolving field theory explain the torque-slip characteristics of a single-phase induction motor and prove that it cannot produce any starting torque.

17. Draw the phasor diagram of a single-phase series motor and show that its performance characteristics can be predicted from a circle diagrams. Sketch the typical performance characteristics.

Or

18. What are repulsion motors ? Why are they so named ? Develop the phasor diagram for the performance calculation of a single-phase repulsion motor for a brush shift of α electrical degrees.

19. An induction motor has a double cage rotor with equivalent impedance at standsftill of $(1.0 + j1.0)$ and $(0.2 + j4.0)$ ohms. Find the relative values of torque given by each cage (a) at starting and (b) at a slip of 5%.

Or

20. Write short notes on the following :—

(i) Linear Induction motor.

(ii) Commutator motors.

(iii) Schrage motors.

(5 × 12 = 60 marks)

G 6933 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch : Electrical and Electronics Engineering

ELECTRICAL DRIVES AND CONTROL (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Mention the advantages of electric drives.
2. Describe the speed-torque characteristics of DC series and DC shunt motors.
3. Discuss the classification of D.C. choppers.
4. What is meant by freewheeling with Regeneration in converter fed DC drives.
5. Discuss the principle and application of stator voltage control of induction motors.
6. Explain a static kremer's drive.
7. What is the need for v/f control? Explain its principle and applications.
8. Explain RC principle of Current Source Inverter fed induction motor drive.
9. What are the various methods of speed control of synchronous motors?
10. What is meant by vector control? Explain.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. (a) Draw and explain the torque-speed characteristics at a different firing angles for a full converter feeding a separately excited d.c. motor.

    (b) Explain the various schemes of d.c. motor speed control briefly.

Or

12. A small separately excited d.c. motor is supplied via a half controlled single-phase bridge rectifier. The supply is 240 V, the thyristors are triggered at 110°, and the armature current continues for 50° beyond the voltage zero. Determine the motor speed at a torque of 1.8 Nm, given the motor torque characteristics is 1.0 Nm/A and its armature resistance is 6 Ω. Neglect all converter losses.

Turn over

13. Draw the power circuit diagram and explain the operation of a three-phase full converter fed D.C. drive. Sketch and explain the output voltage and current waveforms at a firing angle of 60°.

Or

14. Explain with neat circuit diagram the operations of chopper fed d.c. series motor. Obtain the expression for average motor current and torque.

15. Explain the various controller configurations for stator voltage control of induction motors. Draw and explain the speed-torque curves.

Or

16. Explain the principle of slip power recovery scheme for induction motor. Draw the circuit diagram and explain the working of slip power recovery using solid state Scherbins system.

17. State and explain the various schemes for induction motor speed control by voltage source inverters..

Or

18. Explain the operation of induction motor for two different cases when fed by current source inverters :

    (a) Operation under fixed frequency.

    (b) Operation under variable frequency.

19. (a) Discuss briefly the adjustable frequency operation of synchronous motors.

    (b) Discuss the voltage source inverter drive with open loop control.

Or

20. Draw and explain the block diagram of a self controlled synchronous motor fed from a three-phase inverter.

(5 × 12 = 60 marks)

G 6941 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch : Electrical and Electronics Engineering

UTILISATION OF ELECTRICAL POWER (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is an electric drive ? Classify various types of electric drives.
2. What is rhenstatic braking ? Explain the operation of DC series motor when subjected to rhenstatic braking.
3. Explain the terms : —
   (i) Adhesive Weight.
   (ii) Train Resistance.
4. Draw and explain the torque current characteristics of series and compound motors.
5. Explain the Industrial applications of high frequency induction heating.
6. Briefly explain metal arc welding.
7. Define the terms :
   (i) Luminous Intensity. (2 marks)
   (ii) Candle Power. (2 marks)
8. Enumerate the types of air conditioning systems.
9. Discuss the need of energy saving.
10. What is wind power ? Discuss the factors on which the power depends ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Explain the characteristics of motors for application in cement mills and cranes.

Or

Turn over

12. A 50 HP, 400 V, 750 rpm. synchronous motor has a moment of Interia of 20 kgm^2 and employs rheostatic braking for obtaining rapid stopping in cases of emergency. When the motor is running at full load, star connected braking resistor of 2 ohm per phase is switched in. Determine the time taken and the number of revolutions made before the motor is stopped. Assume an efficiency of 90% and a full load power factor of 0.95.

(12 marks)

13. What are the typical values of acceleration and braking retardation in electric traction ? How is the value of acceleration and retardation calculated from the data of a typical speed time curve ?

Or

14. With the help of neat diagrams explain about the series – parallel control of DC Series motors and its energy saving.

(12 marks)

15. With the help of neat diagrams discuss any *three* types of electronic controls employed in resistance welding.

Or

16. (a) Explain the design procedure of resistance heating elements.

(b) A 15 kW, 220 V, Single phase resistance oven employs nickel – chrome wire for its heating elements. If the wire temperature is not to exceed 1000 °C and the temperature of the charge is to be 600 °C, calculate the diameter and length of the wire. Assume radiating efficiency as 0.6 and emissivity as 0.9.

(12 marks)

17. What are polar curves ? Explain Rousseau diagram and its importance in illuminating Engineering.

Or

18. With neat sketches explain about the different types of refrigeration. Mention the merits and demerits of each types.

(12 marks)

19. Discuss briefly on energy management techniques applied in an organisation.

Or

20. Discuss the merits and demerits of different types of non-conventional energy sources.

(12 marks)

[5 × 12 = 60 marks]

G 6951 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch : Electrical and Electronics Engineering

CONTROL SYSTEMS II (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *the questions.*
Each question carries 4 *marks.*

Part A

1. Draw the circuit and then derive the transfer function of a lead compensator.
2. Under what circumstances a lag compensator is selected ?
3. What are the properties of Z-transform ?
4. Discuss the significance of system characteristics equation.
5. What are the characteristics of non-linear systems ?
6. Define describing function.
7. Derive the relationship between state model and transfer function of a system.
8. Define State transition matrix.
9. Define controllability and observability.
10. What is vector matrix difference equation ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. The openloop transfer function of a Unity feedback system is $G(s) = 10/[s(s+2)(s+8)]$. Design a compensator so that $K_v = 80/s$ and the dominant closed loop poles are at $-2 \pm j2\sqrt{3}$.

Or

12. The openloop transfer function of a unity feedback system is $G(s) = 4/[s(s+2)]$. Design a compensator to meet the specifications. $K_v = 20/s$, phase margin is at least 50° and gain margin is at least 10 dB.

Turn over

13. Find the impulse response of the system described by the difference equation $y(n)-y(n-1)+y(n-2)=x(n)-\frac{1}{2}x(n-1)$ using Z transform.

Or

14. Using Jury's test, determine the stability of the following systems : —

(a) $Z^2-1.7Z+0.66=0$.

(b) $Z^3-2.2.2Z^2+1.51Z=0.33=0$.

15. Determine the nature of the singular points of the non-linear system :

$$\ddot{x}+\dot{x}/2-2x+x^2=0.$$

Or

16. Explain with an example the method of determining stability of nonlinear system using describing function.

17. Obtain a state model of the system represented by $\dddot{x}+9\ddot{x}-26\dot{x}+24x=\dot{u}+6u$.

Or

18. Obtain the state transition matrix for the system with $A=\begin{bmatrix}0 & 1 & 0\\ 0 & 0 & 1\\ -9 & -23 & -15\end{bmatrix}$

19. The closed loop transfer function of a unity feedback system is given by $(s)/R(s)=(640+160s)/\left[640+192s+18s^2+s^3\right]$. Obtain a state model of the system.

Or

20. The state model of a system is given by :

$$\dot{X}=\begin{bmatrix}2 & 0 & 0\\ 0 & 2 & 0\\ 0 & 3 & 1\end{bmatrix}X+\begin{bmatrix}0 & 1\\ 1 & 0\\ 0 & 1\end{bmatrix}U$$

$$Y=\begin{bmatrix}1 & 0 & 0\\ 0 & 1 & 0\end{bmatrix}X$$

Test for state controllability, output controllability and observability.

(5 × 12 = 60 marks)

F 3680 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2010

Seventh Semester

Branch : Electrical and Electronics Engineering

NEURAL NETWORKS (Elective-I) (E)

(Regular/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. What is an artificial neuron?
2. Explain the principle of linear separability.
3. Explain why BPN is a feed forward network.
4. Differentiate between local minima and global minima.
5. What are the specific applications of CPN?
6. Discuss the statistical properties of CPN.
7. Explain the characteristics of Boltzmann's machine.
8. What are the advantages of statistical methods of computing?
9. What are the applications of associative memory?
10. Discuss on the classification of ART networks.

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. Discuss the training algorithm of a multi-layer perceptron.

Or

12. Explain with examples the necessity of multi-layer networks.
13. Draw and explain the architecture of a BPN. What are its characteristics?

Or

14. Discuss the parameters and their selection process in the case of BPN.

Turn over

G 6962 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch—Electrical and Electronics Engineering

SYSTEM DESIGN WITH MICROCONTROLLERS (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

Each question carries 4 *marks.*

1. Name the math flags used in 8051 and give a description of each of them.
2. Differentiate between maskable and nonmarkable interrupts of 8051.
3. What are the functions of DPTR ?
4. Why do we go for bit operators in 8051 ?
5. Differentiate between CJNE and DJNZ instructions of 8051.
6. Describe the methods that are used to alert the receiving program that serial data has arrived in 8051.
7. Differentiate between bounce and keyhold with respect to a keyboard.
8. Describe how analog to digital conversion takes place in 8051.
9. What happens if an 8255 is added to 8051 ?
10. How do you check whether the crystal and reset circuit are working in 8051 ?

(10 × 4 = 40 marks)

Part B

Each question carries 12 *marks.*

11. How do you prove that 8051 has incorporated features that make it technically and economically feasible ?

Or

12. Describe the different modes of serial data transmission in 8051.

Turn over

13. Discuss how external memory is addressed in 8051.

Or

14. Write a program in 8051 to swap the nibbles of R_0 and R_1 so that the low nibble of R_0 swaps with the high nibble of R_1 and the high nibble of R_0 swaps with the low nibble of R_1.

15. Explain the different ways in which Timing subroutines are incorporated in 8051.

Or

16. With a look up table, write a program that converts the hex number (O – F) to its ASCII equivalent.

17. Describe the different ways of wiring configuration for a 16 key keyboard.

Or

18. Write a program for the LCD display that will display the contents of register R_1 as follows :

    $R_1 = XX$

    where XX is the R_1 contents in hex center the display.

19. With a neat block diagram, describe how frequency can be measured using 8051.

Or

20. With a neat diagram, describe how temperature measurements are done in 8051.

(5 × 12 = 60 marks)

G 6988 (Pages : 2) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch : Electrical and Electronics Engineering

BIOMEDICAL INSTRUMENTATION (E) (Elective I)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 4 *marks.*

1. What are action potentials? How they are generated and propagated?
2. Draw the ECG waveform and explain.
3. What is GSR? Mention the permissible ranges of GSR and ESR.
4. Explain the working principle of cardiac pacemakers.
5. Explain how O_2 of exhaled air is measured.
6. Explain the Principle of operation of an inhalator. What are its uses?
7. Draw the typical EEG waveforms and explain.
8. Briefly explain the functions of somatic nervous systems and neuronal receptors.
9. Briefly explain the NMR Components.
10. What are the properties of X-rays?

(10 × 4 = 40 marks)

Part B

Answer **all** *questions.*

Each question carries 12 *marks.*

11. (a) Explain the cardiovascular and respiratory systems of the body.

    (b) Explain with diagram the conducting system of heart.

Or

12. (a) Describe the 12-lead system of measurement of ECG with diagrams.

    (b) What is meant by sodium pump? Explain with its significance.

Turn over

13. What are heart sounds? What are the causes of heart sounds? Explain in detail different types of heart sounds?

Or

14. What is meant by fibrillation? How do you correct for it? Draw the circuit of a direct-current defibrillator and explain.

15. (a) Explain with diagram different types of respirators? What are their applications?

    (b) Explain any *one* method for the measurement of respiration rate.

Or

16. What are ventillators? Explain in detail different types of ventillators.

17. Explain with diagram the 10-20 electrode system of EEG measurement. What are its applications?

Or

18. Explain in detail with diagram the functional organization of brain.

19. Draw the block diagram of a Computer tomography system and explain. Also explain how the image is reconstructed.

Or

20. (a) What are dialysers? Explain any one type with diagram.

    (b) Draw the block diagram of a surgical diathermy machine and explain. What are its applications?

[5 × 12 = 60 marks]

G 7004 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, APRIL 2011

Seventh Semester

Branch—Electrical and Electronics Engineering

ELECTRICAL DRAWING (E)

(Improvement/Supplementary)

Time : Three Hours Maximum : 100 Marks

Part A

Any missing data may be assumed suitably.
Answer any **two** *questions from Part A and* **two** *questions from Part B.*
All questions carry equal marks.

1. Draw the developed winding diagram for a d.c. machine armature having 32 armature conductors, 4 pole. Show 25% equalizer connections.

2. Draw the half sectional elevation of a d.c machine armature with commutator :

External dia of armature	:	45 cm
Length of armature core	:	22.5 cm
Length of winding overhang	:	15 cm
Diameter of commutator	:	28 cm
Length of commutator	:	10 cm
Shaft diameter	:	10 cm

3. Draw the full sectional elevation and sectional plan of a single-phase 220 V/6600 V 10 kVA transformer. LT winding is in two layers and HT winding has 4 coils per limb :

Core :

Cross-section of the core	...	3 step
diameter of circumcircle	...	6.5 cm
distance between core centres	...	18.5 cm
Yoke height	...	6 cm

LT winding :

Outside diameter of 1st layer	...	9.25 cm
Inside diameter of 1st layer	...	7 cm
Outside diameter of 2nd layer	...	12.1 cm

Turn over

thickness of each layer ... 1.2 cm

No. of turns/limb/layer ... 25

height of LT winding ... 20 cm

HT winding

outside diameter of HT winding ... 17 cm

Inside diameter of HT coil ... 12.5 cm

no. of coils/limb ... 4

no. of turns per coil ... 750

height of HT winding ... 20 cm

total height of transformer ... 36 cm

Five baketite rings of 4 mm thickness each are to be provided on each limb at the top and bottom of the windings.

(2 × 25 = 50 marks)

Part B

All questions carry equal marks.

4. Draw the developed winding diagram of a 3 phase mush-connected armature with 4 poles and 24 slots.

5. The details of a 7.5 kW, 3-phase, 50 Hz, 4 pole squirrel-cage induction motor are as follows :—

Inside diameter of stator ... 18 cm

Outside diameter of stator ... 32 cm

Cross length of stator core ... 13.5 cm

It has one ventilating duct of 1.3 cm width

Number of Slots ... 36

Slot width ... 0.77 cm

Length of air gap ... 0.1 cm

Rotor

Number of slots ... 31

Rotor bars ... 0.51 cm × 1.52 cm

End ring area ... 1.69 sq.cm

Shaft diameter ... 5.1 cm

Rotor is of squirrel-cage type and is mounted directly on the shaft

Overall height of the motor ... 47.5 cm

Assuming suitable dimensions and shapes for the motor frame and other parts, draw to suitable scale, the half sectional longitudinal view.

6. Draw the half sectional end view of an AC 3300 V 3 phase 50 cycle 5740 kVA turbogenerator of 3000 r.p.m.

Armature (Stator)

Outside diameter ... 14.2 cm

Inside diameter ... 68.5 cm

Slots semi-closed type 42 nos. of size 2.3 × 9.5 cm

Rotor :

One piece forging :

No. of slots ... 24

Slot at mid-pole spaced ... 31.5

Slot depth ... 11.75

Air gap length (radial) ... 2.86 cm

Shaft diameter (at the bearings) ... 22 cm.

(2 × 25 = 50 marks)